Robin Industrial Engines®

SERVICE MANUAL

Models
EC06, EC08

1193S120

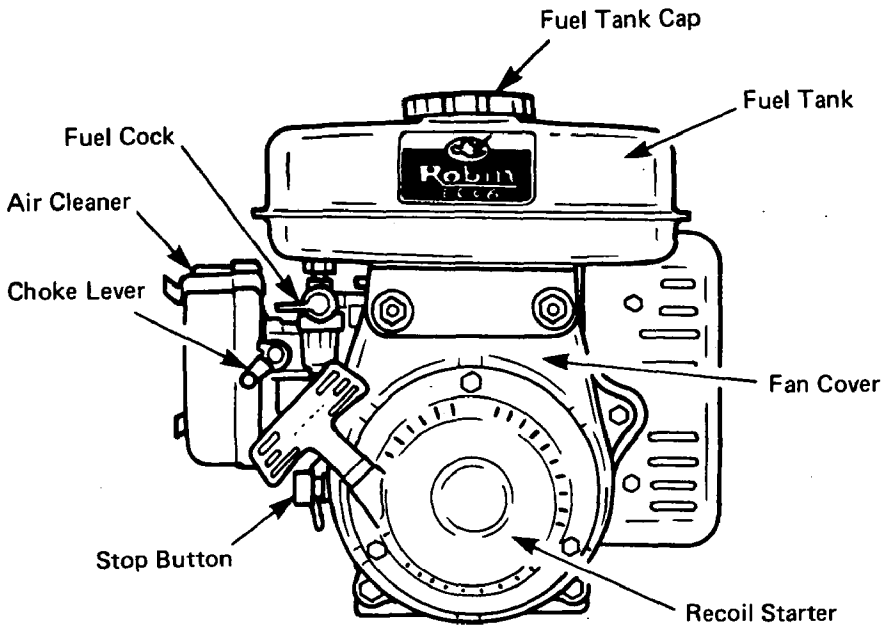
Robin®

ROBIN AMERICA, INC.
ROBIN TO WISCONSIN ROBIN
ENGINE MODEL CROSS REFERENCE LIST

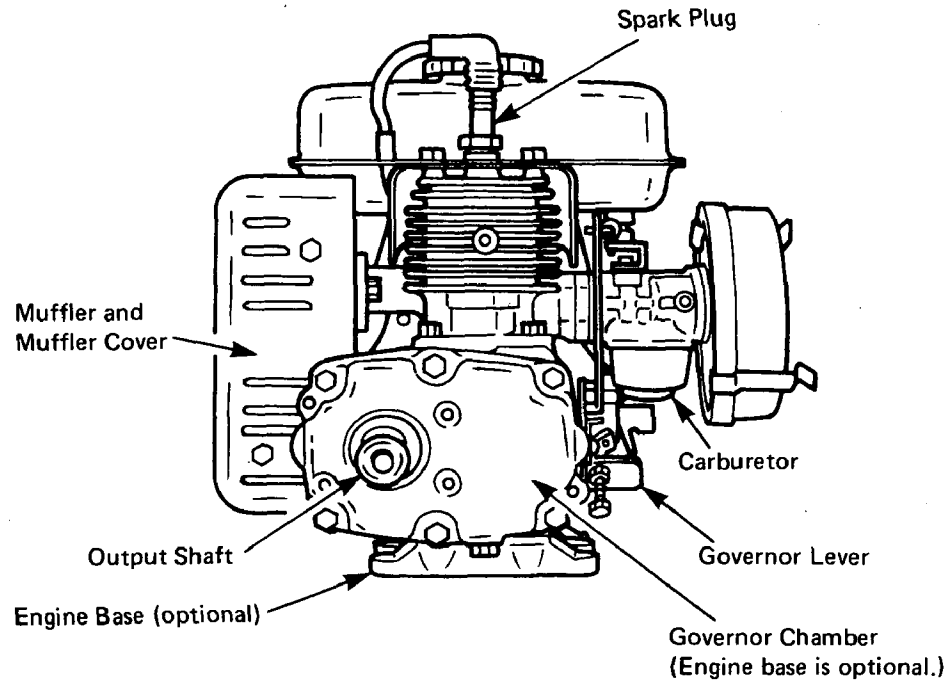
ROBIN	WISCONSIN ROBIN
SIDE VALVE	
EY08	W1-080
EY15	W1-145
EY15V	W1-145V
EY20	W1-185
EY20V	W1-185V
EY23	W1-230
EY28	W1-280
EY35	W1-340
EY40	W1-390
EY45V	W1-450V
EY21	EY21W
EY44	EY44W
EY18-3	EY18-3W
EY25	EY25W
EY27	EY27W
OVERHEAD VALVE	
EH11	WO1-115
EH12	WO1-120
EH15	WO1-150
EH17	WO1-170
EH21	WO1-210
EH25	WO1-250
EH30	WO1-300
EH30V	WO1-300V
EH34	WO1-340
EH34V	WO1-340V
EH43V	WO1-430V
TWO CYCLE	
EC13V	WT1-125V
DIESEL	
DY23	WRD1-230
DY27	WRD1-270
DY30	WRD1-300
DY35	WRD1-350
DY41	WRD1-410

CONTENTS

Section	Title	Page
1.	**SPECIFICATIONS**	1
2.	**PERFORMANCE**	2
2-1	Maximum Output	2
2-2	Rated Continuous Output	2
2-3	Maximum Torque and Fuel Consumption Ratio at Maximum Output	2
3.	**FEATURES**	4
4.	**DISASSEMBLY and REASSEMBLY**	5
4-1	Preparations and Suggestions	5
4-2	Special Tools	5
4-3	Disassembly Procedure	6
4-4	Reassembly Procedure	9
5.	**CONTACT BREAKER ADJUSTING PROCEDURE (EC06)**	13
6.	**CARBURETOR ADJUSTMENT**	14
7.	**GOVERNOR ADJUSTMENT**	15
8.	**TROUBLE-SHOOTING**	16
8-1	Starting Trouble	16
8-2	Idling Improper	19
8-3	Overheating and Engine Knocking	19
8-4	Power Drop	19
8-5	Excessive Fuel Consumption	20
8-6	Hunting	20
8-7	Other Troubles	20
9.	**CHECKS and CORRECTIONS**	21
9-1	Engine Standard Correction Table	22
9-2	Table of Tightening Torque	24
10.	**MAINTENANCE and STORING**	25
10-1	Daily Checks and Maintenance	25
10-2	Every 50 Hours Checks and Maintenance	25
10-3	Every 150 Hours Checks and Maintenance	25
10-4	Yearly Checks and Maintenance	25
10-5	Preparation for Long Abeyance	25


Fuel Tank Cap
Fuel Tank
Fuel Cock
Air Cleaner
Choke Lever
Fan Cover
Stop Button
Recoil Starter

EC06D


Spark Plug
Muffler and
Muffler Cover
Carburetor
Output Shaft
Governor Lever
Engine Base (optional)
Governor Chamber
(Engine base is optional.)

EC06B

1. SPECIFICATIONS

Model		EC06D	EC06B	EC08D	EC08B
Type		Air-Cooled, 2-Cycle, Vertical, Piston Valve Type, Single Cylinder Gasoline Engine			
Bore x Stroke		44 mm x 40 mm		50 mm x 40 mm	
Piston Displacement		60.8 cc		78.5 cc	
Continuous Rated Output (HP/rpm)		1.6/3600, 1.9/4500	1.6/1440, 1.9/1800	2.2/4500	2.2/1800
Maximum Output (HP/rpm)		2.5/5000	2.5/2000	3.3/5500	3.3/2200
Maximum Torque (kg-m/rpm)		0.38/3700	0.95/1480	0.51/3600	1.27/1440
Direction of Rotation		Counterclockwise as viewed from P.T.O. Shaft Side			
Lubrication		Fuel-lubricant Mixture Type			
Lubricant		2-Cycle Engine Oil			
Carburetor		Float Type			
Fuel		Gasoline-lubricant Mixture (20 ~ 25 : 1)			
Fuel Consumption Ratio (gr/HP-h)		390 at Rated Continuous Output		380 at Rated Continuous Output	
Fuel Feed		Gravity Type			
Fuel Tank Capacity		1.5 Litres			
Ignition System		Flywheel Magneto Type (Contactless Magneto Type is also available.)		Contactless Magneto Type	
Spark Plug		NGKB6HS		NGKB7HS	
Starting System		Recoil Starter			
Speed Governor		Centrifugal Flyweight Type			
Speed Reduction System		–	1/2.5 Reduction Gear	–	1/2.5 Reduction Gear
Reduction Chamber Oil		–	SAE#30	–	SAE#30
Air Cleaner		Semi-wet Type			
Dry Weight		7.6 kg	8.6 kg	7.8 kg	8.8 kg
Dimensions	Length	256 mm	285 mm	256 mm	285 mm
	Width	307 mm	307 mm	307 mm	307 mm
	Height	287 mm	287 mm	287 mm	287 mm

2. PERFORMANCE

2-1 MAXIMUM OUTPUT

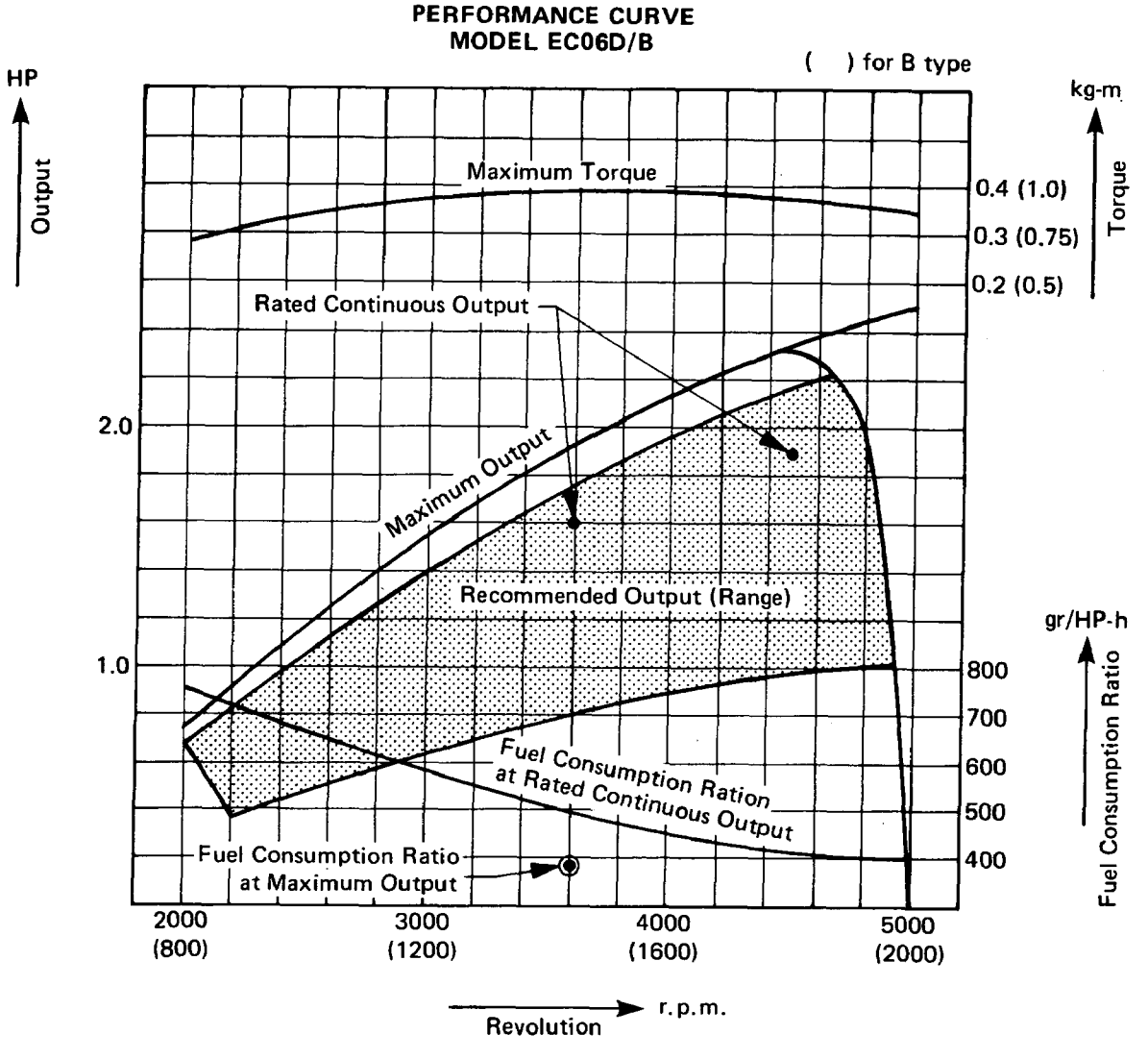
Maximum output refers to the standard power produced by a sufficiently run-in engine with the carburetor throttle valve fully open.
A new engine cannot always deliver maximum output power because it has not been well run in.

2-2 RATED CONTINUOUS OUTPUT

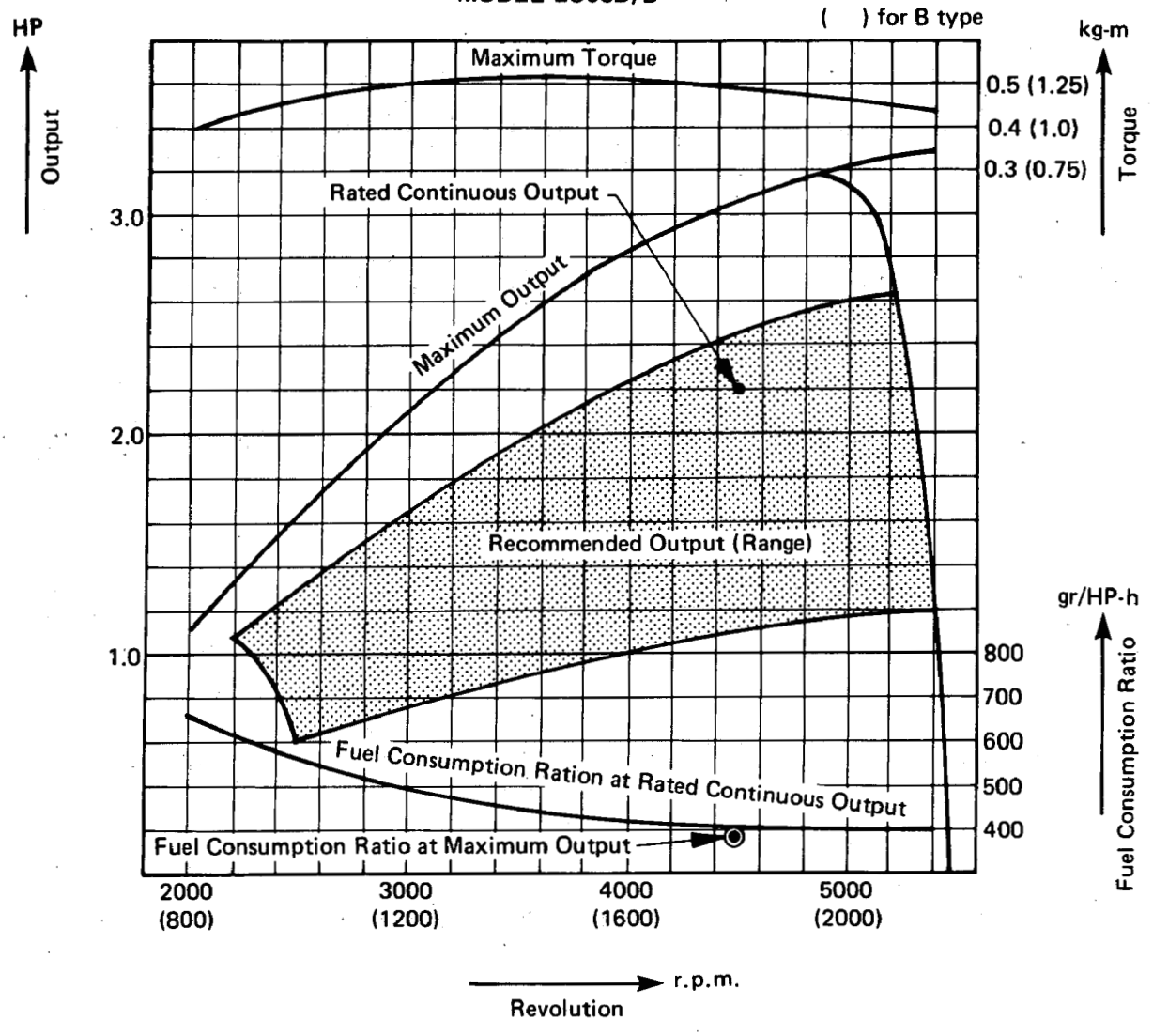
The term refers to a continuous output most ideal to engine life and fuel consumption under governor control. In combining your ROBIN engine with a load, design your driving system so that the engine may be continuously used at a load level not exceeding the rated continuous output.

2-3 MAXIMUM TORQUE and FUEL CONSUMPTION RATIO at MAXIMUM OUTPUT

Maximum torque refers to the driving torque of the drive shaft when the engine is driving the external load at maximum output.
The term fuel consumption ratio at maximum output refers to the fuel consumption ratio when the engine is operation at the maximum output.



PERFORMANCE CURVE
MODEL EC08D/B



3. FEATURES

1. Compact, lightweight, high-powered engine with reliable operation also in the low speed range
2. Extremely simple in construction, trouble-free, and very easy to use
3. Quiet running engine using a lined aluminium cylinder (EC06)
4. Equipped with T.C.I. (Transistor Circuit Ignition)
5. So durable that the engine can stand hours of tough work.
   Needle bearings are used for the crank pins and piston bearings to enable the engine to withstand high-speed operation under heavy load.
6. The carburetor works at inclinations of up to aboaut 30° so that the engine can operate until the fuel overflows from its air vent.
7. The recoil starter permits easy starting.
8. Useful in a wide range of applications
   A direct-coupled, reduction type engine, and other types that differ from the standard models in drive shaft dimensions and shape are also available.
9. The all-speed governor operates at any engine speed.
   The desired rpm. can be obtained by simply moving the control lever, and it remains constant even if the load changes.
10. Resistant to vibration (EC08)
    Manufacturers of rammers and plates (machines for compacting earth by vibration) around the world are using these ROBIN engines.

4. DISASSEMBLY and REASSEMBLY

4-1 PREPARATIONS and SUGGESTIONS

•Disassembly

1) In disassembling, remember the location of each part so that the disassembled parts can be reassembled in the right way. Attach tags to those parts which might be mistaken for others.
2) Carefully handle the gaskets because they can easily break.
3) Temporarily fasten disassembled parts in their original positions to prevent them from missing and wrong reassembly.
4) Carefully handle disassembled parts and clean them with kerosene.
5) Use the correct tools in the correct way.
6) Items necessary for disassembly and reassembly
   a. Work bench b. Kerosene pan c. Disassembly tools d. Kerosene or gasoline
   e. Sandpaper, spatula, waste cloth
7) Be sure to discharge the fuel and oil before disassembling.

•Reassembly

1) Use new packing and gaskets in reassembling the engine.
2) Clean the parts with fresh gasoline, and blow them dry with compressed air before reassembling.
3) Apply 2-cycle oil to the rotary and sliding parts.
4) Keep the parts free of dust during reassembly.
   Tighten the bolts, nuts, and screws with the specified torques.
5) Each time a set of main parts is installed, manually turn it and check for smoothness and noise.
6) After reassembling the engine, turn it manually and check for abnormalities and looseness.

4-2 SPECIAL TOOLS

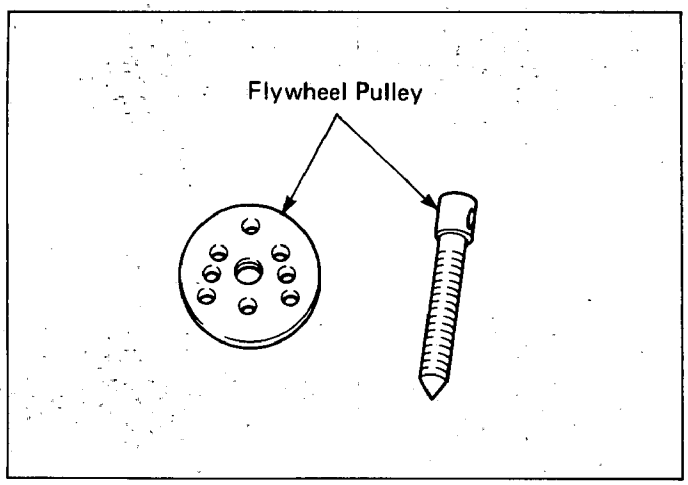


Fig. 1

4-3 DISASSEMBLY PROCEDURE

4-3-1 DISCHARGING FUEL

Discharge the fuel from the fuel tank.

4-3-2 FUEL TANK

1) Disconnect the pipe connecting the fuel filter to the carburetor at the carburetor end.
2) Remove the fuel tank from the cylinder and fan cover.

4-3-3 STOP BUTTON CORD

Disconnect the cord from the socket terminal.

4-3-4 FAN COVER

Remove the bolts and then the fan cover together with the stop button.
Note: The rubber baffle comes off simultaneously.

4-3-5 CYLINDER COVER

Remove the bolts and then the cylinder cover.

4-3-6 STARTER PULLEY

Remove the bolts and then the starter pulley from the flywheel.

4-3-7 MAGNETO and FLYWHEEL

Remove the nut and take the flywheel from the front end of the crankshaft using the flywheel puller. (See Fig. 2.)

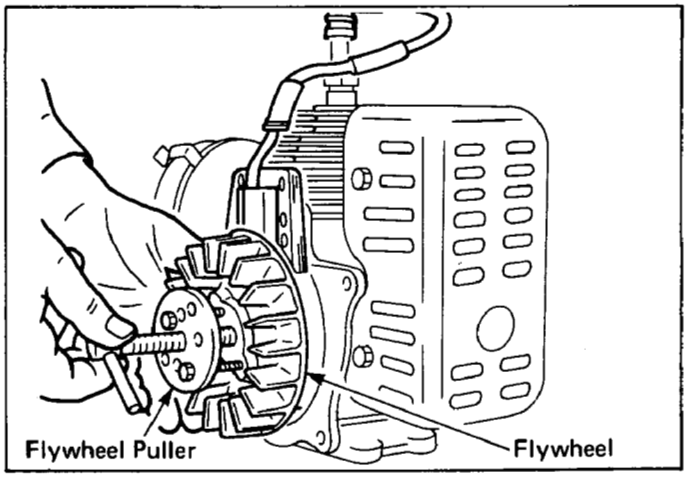


Fig. 2

4-3-8 WOODRUFF KEY

Hold a screwdriver with its flat part on the woodruff key, and lightly strike the screwdriver to remove the key with a mallet.

4-3-9 CONTACT BREAKER, CAPACITOR, IGNITION COIL

[Point Type for EC06 (See Fig. 3A.)]

1) Remove the screws that fasten the capacitor and point cover together, and remove the point cover from the crankcase.
2) Remove the socket type terminal and mounting screws, remove the capacitor, contact breaker, and ignition coil from the crankcase in this order.
Note: Exercise care in removing the grommet from the crankcase.

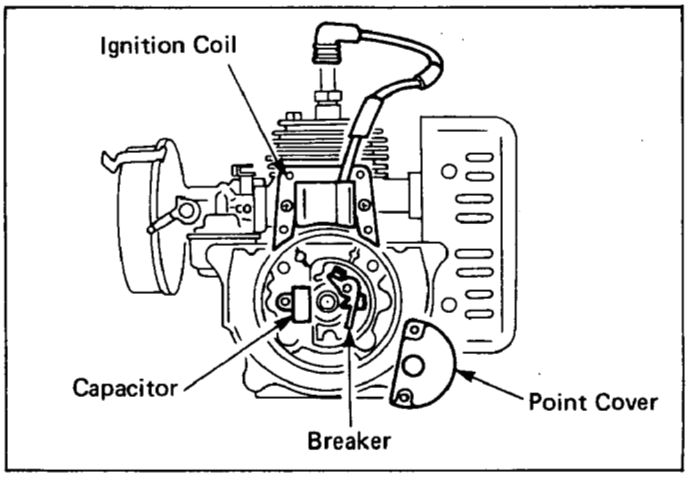


Fig. 3A

[T.C.I. (Transistor Control Ignition) magneto]

1) **Features**

The T.C.I. magneto completely solves the problems with the conventional point type magneto, that is, stains, burns, rusting during long storage, ignition timing deviation due to mechanical wear, etc.

2) **Construction**

The components of the magneto assembly are as shown in Fig. 3B. The main parts of the magneto are explained.

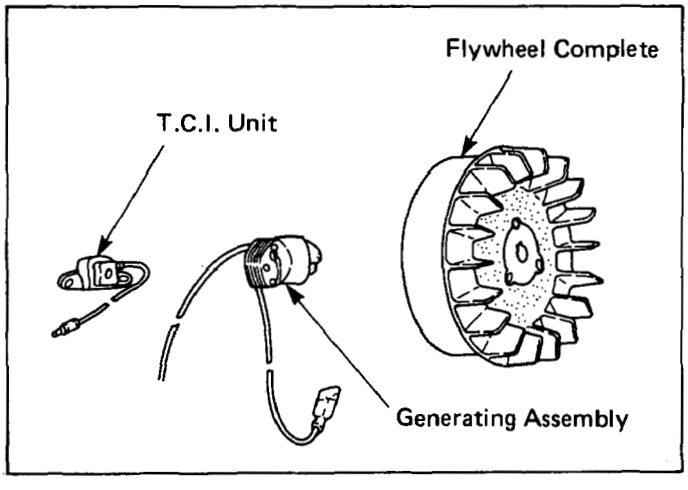


Fig. 3B

a) FLYWHEEL COMPLETE

The FLYWHEEL COMPLETE has permanent magnets so that the rotation of these magnets generates an AC electromotive force in the primary coil of the generating assembly.

b) GENERATING ASSEMBLY

The GENERATING ASSEMBLY consists of the primary coil and secondary coil. The rotation of the FLYWHEEL COMPLETE generates a voltage in the primary coil and feeds a current. At the same time a high voltage is induced in the secondary coil. This high voltage causes the spark plug to spark.

c) T.C.I. UNIT

The T.C.I. UNIT consists maily of an SCR and other semi-conductor parts. It senses the primary current waveform generated in the GENERATING ASSEMBLY, and switches the transistor to cut off the primary coil current.

This abrupt current change causes a high voltage to be induced in the secondary coil.

3) **Wiring diagram**

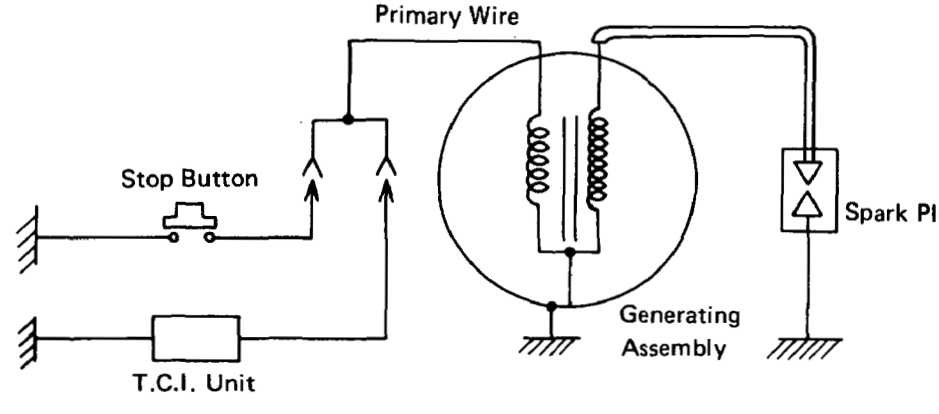


Fig. 3C

4-3-10 CARBURETOR, GOVERNOR LEVER

1) Remove the nut and then the carburetor from the cylinder.
2) Loosen the nut, and remove the governor lever from the governor shaft.
3) Remove the governor spring from the governor lever.

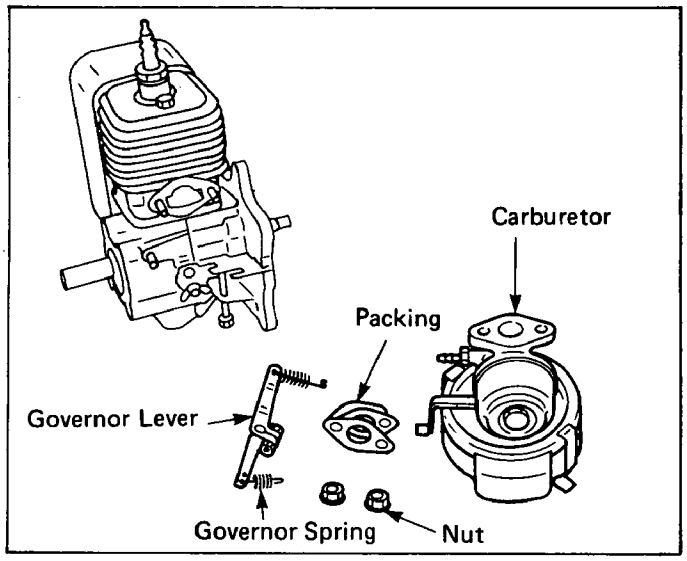


Fig. 4

4-3-11 SPARK PLUG

Remove the spark plug using a box wrench.

4-3-12 MUFFLER (MUFFLER COVER)

Remove the nuts, and then the muffler from the cylinder. (See Fig. 5.)

Note: Keep the muffler cover on.

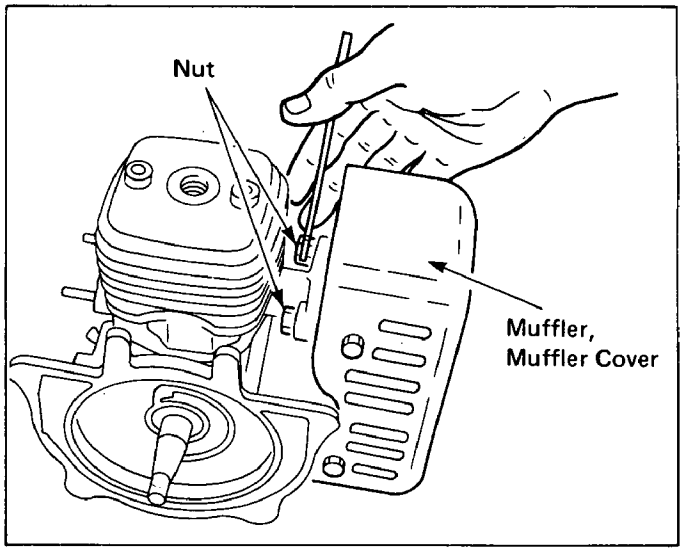


Fig. 5

4-3-13 REDUCTION GEAR (Type B only)

1) Remove the drain plug from the reduction chamber to discharge the oil.
2) Remove the reduction chamber cover from the engine.
3) Remove the nuts, and pull the reduction pinion out from the crankshaft.
   (See Fig. 6.)
4) Remove the woodruff key.

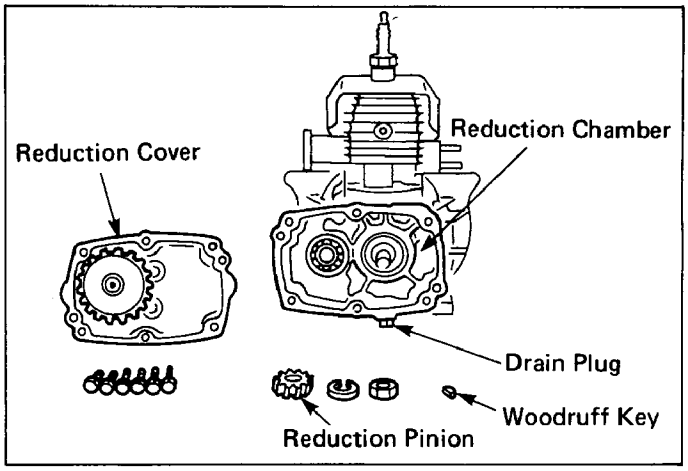


Fig. 6

4-3-14 CYLINDER

Remove the nuts, and carefully lift the cylinder off, exercising care not to damage the contact surfaces of the piston and cylinder. (See Fig. 7.)

Note: Hold the piston when the cylinder is lifted to a certain height from the crankcase, and raise the cylinder off the piston. Damage to them can be prevented this way.

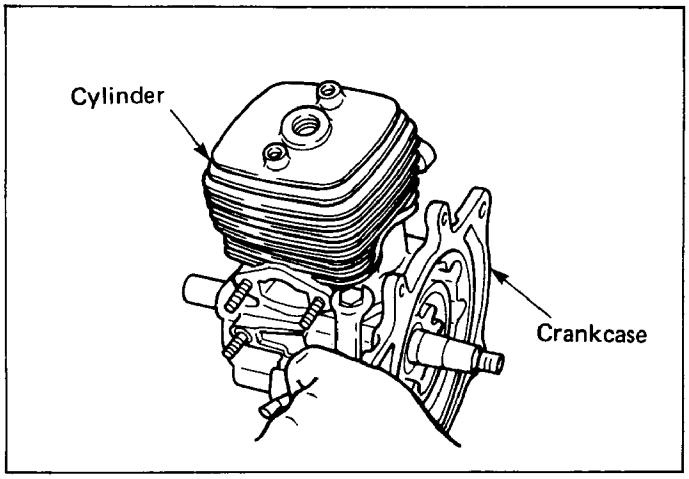


Fig. 7

4-3-15 DIVIDING CRANKCASE

Remove the bolts, and carefully strike the crankcase with a mallet to part it. (See Fig. 8.)
Clean the divided crankcase with gasoline, and apply engine oil to the bearing, and grease to the oil seal lips.
Note: Be careful not to damage the crankcase joint.

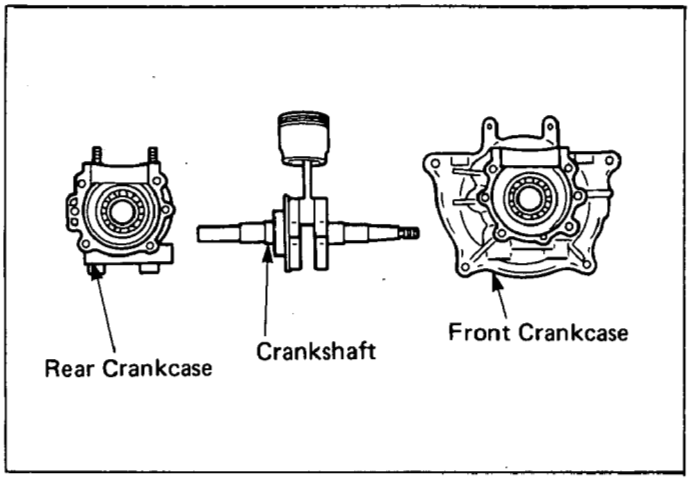


Fig. 8

4-3-16 PISTON, PISTON PIN, NEEDLE BEARING, and CLIPS (See Fig. 9.)

Remove the clips. With a iron rod 10 to 11 mm in diameter on the piston pin, lightly strike it with a plastic Hammer to remove the piston pin. Pull out the iron rod, and remove the piston and needle bearing.
Note: Be careful not to damage the piston pin hole in the piston.

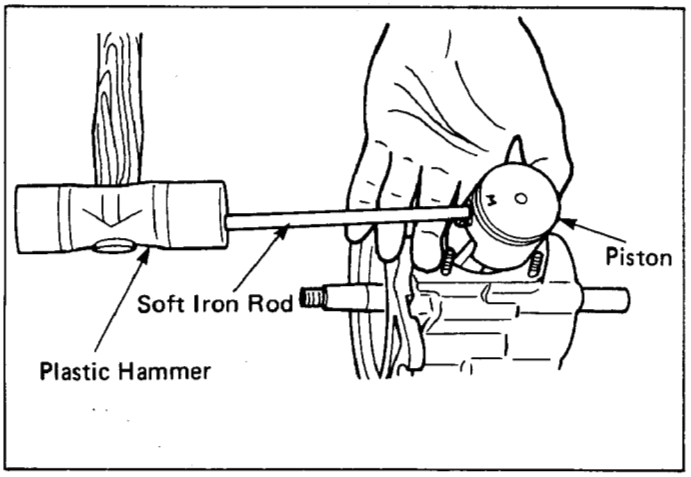


Fig. 9

4-4 REASSEMBLY PROCEDURE

4-4-1 CRANKSHAFT COMPLETE and PISTON

Apply engine oil to the needle bearing, and fit it onto the small end of the connecting rod. With the mark M on the piston head on the flywheel (magneto) side, fit the piston head on the piston. Apply engine oil to the piston, and lightly strike the pin into the piston with a mallet (until the pin is poisitoned inward of the clip grooves). Then fit two clips into the clip grooves. (See Fig. 10.)
Note: Be careful not to damage the piston pin hole in the piston. Be sure to use new clips. The mark M must be in the direction of the front end of the crankshaft.

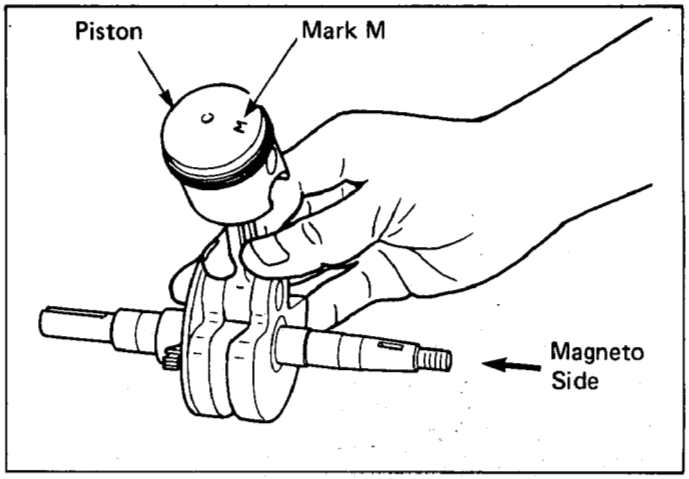


Fig. 10

4-4-2 INSERTING CRANKSHAFT INTO CRANKCASE

Place the rear half of the crankcase on the work bench securely, and insert the crankshaft into the crankcase bearing by hand.
Note: See that the front and rear halves of the crankcase can be reassembled properly.

4-4-3 CRANKCASE REASSEMBLY (See Fig. 11.)

Wipe the joint surfaces of the front and rear halves of the crankcase until oil is completely removed from them, apply a sealant to them, and with the dowels in line with their matching holes, reassemble the crankcase.
Note: Exercise good care not to damage the governor sleeve, yoke assembly, and oil seals. Keep the joint surfaces of the front and rear halves of the crankcase parallel to each other in pressing them together into the original assembly.

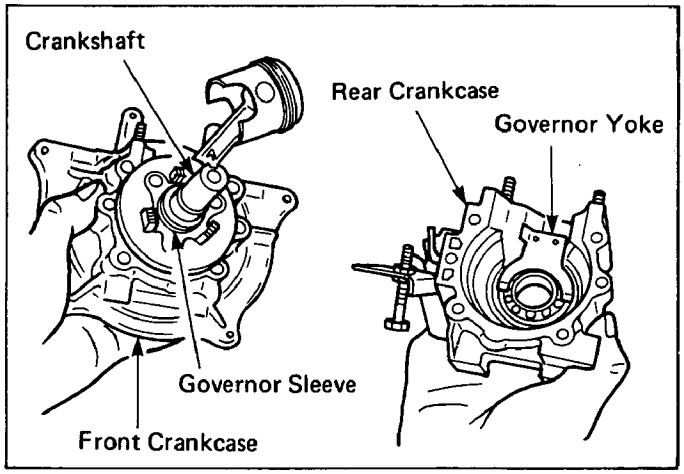


Fig. 11

4-4-4 CRANKCASE

Tighten the bolts with spring washers and plain washers.

Note: Tightening torque . . . . . 110 ± 20 kg-cm

4-4-5 CYLINDER REASSEMBLY (See Fig. 12.)

Replace the old cylinder gasket with a new one, apply oil to the cylinder and piston, make sure that the piston rings and cylinder are positioned correctly, and install the cylinder.

Note: Be careful not to let the gasket slide out of place.

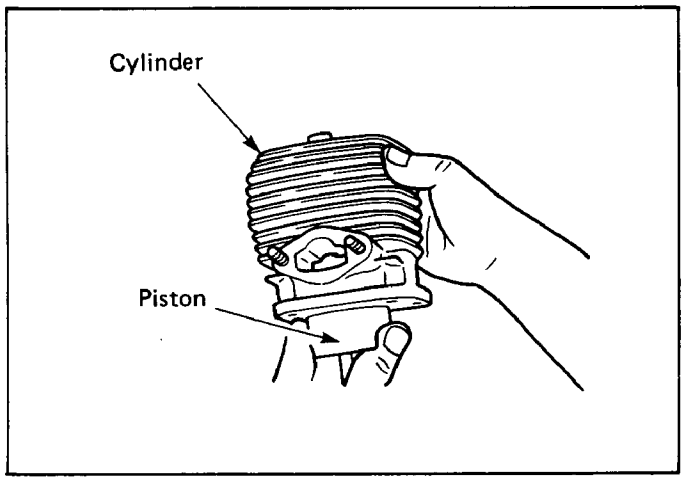


Fig. 12

4-4-6 CYLINDER TIGHTENING

Tighten the nuts with spring washers and plain washers.

Note: Tigtening torque . . . . . 110 ± 10 kg-cm
Tighten all the four nuts evenly.

4-4-7 SPARK PLUG

Tighten the spark plug into the cylinder.

Note: Tightening torque . . . . . 275 ± 25 kg-cm

4-4-8 GOVERNOR LEVER

Tighten the governor lever to the governor shaft with the nut. (For the adjusting procedure, refer to the section on governor adjustments.)

4-4-9 GOVERNOR SPRING

Hook the governor spring to the governor lever and governor. (See Fig. 13.)

Note: Be careful of the hooking positions.

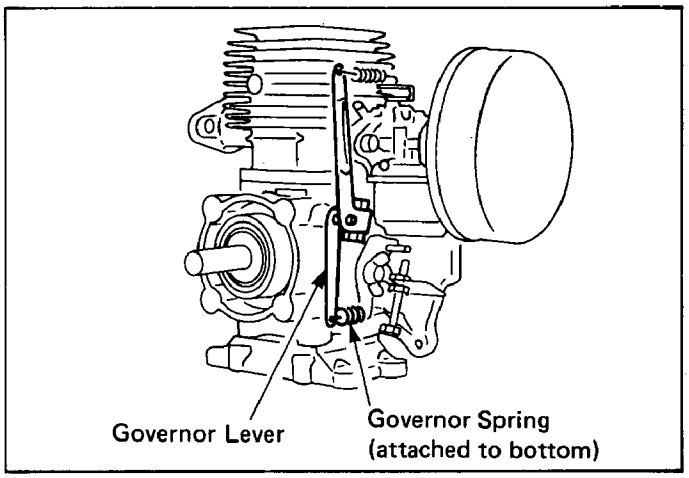


Fig. 13

4-4-10 CARBURETOR

Replace the old gasket with a new one, and install the carburetor.

Note: Tightening torque . . . . . 80 ± 10 kg-cm

4-4-11 MUFFLER (MUFFLER COVER)

Replace the old gasket with a new one, and tighten the muffler to the cylinder.

Note: Tightening torque . . . . . 80 ± 10 kg-cm

4-4-12 WOODRUFF KEY

Drive the woodruff key into the keyway in the crankshaft using a mallet.

Note: Drive it parallel to the shaft axis.

4-4-13 IGNITION COIL TEMPORARY TIGHTENING

With the high-tension cord (to be connected to the spark plug) up, temporarily tighten the ignition coil.

4-4-14 CONTACT BREAKER (POINT) CAPACITOR (EC06)

Install the contact breaker by inserting its shaft into the matching hole in the crankcase. Pass the cord under the capacitor into the cord hole in the crankcase.
Temporarily tighten the capacitor.

4-4-15 IGNITION TIMING CHECK (EC06)

Temporarily install the flywheel, and check and adjust the ignition timing.
(For ignition timing adjustment, refer to the section on contact breaker adjusting procedure.)
Note: Ignition timing . . . . . 23° ±2°

4-4-16 POINT COVER (EC06)

Remove the flywheel, fit the point-to-capacitor lead into the crankcase groove, and install the point cover. (See Fig. 14.)
Tighten the temporarily tightened capacitor securely.
Note: Tightening torque . . . . . 25 ±2 kg-cm

Lead Wiring Method

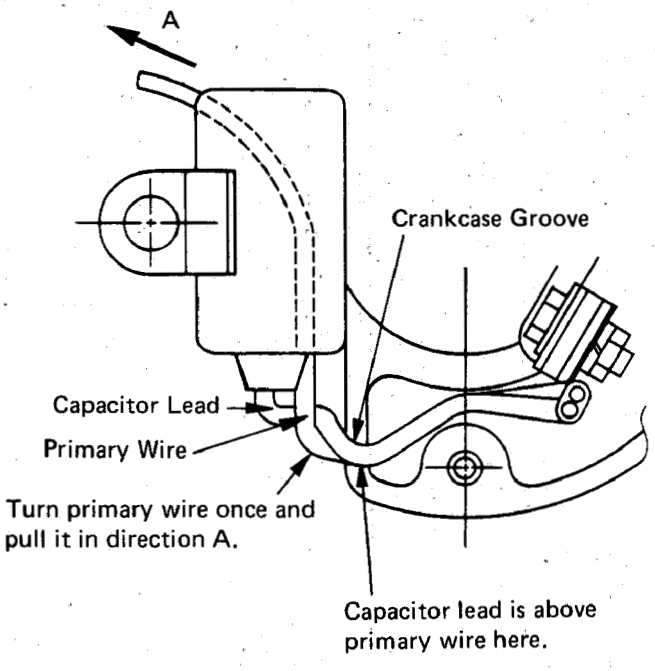

A
Crankcase Groove
Capacitor Lead
Primary Wire
Turn primary wire once and pull it in direction A.
Capacitor lead is above primary wire here.

Fig. 14

4-4-17 FLYWHEEL (MAGNETO)

Install the flywheel on the crankshaft by tightening the nut with plain and spring washers.
Note: Completely remove oil from the tapered portion.

Tightening torque . . . . . 400 ±20 kg-cm

4-4-18 IGNITION COIL

Adjust the air gap with a searcher, and tighten the ignition coil with plain and spring washers. (See Fig. 15.)
Note: Air gap . . . . . $0.5\ ^{0}_{-0.1}$ mm

Tightening torque . . . . . 50 ±5 kg-cm

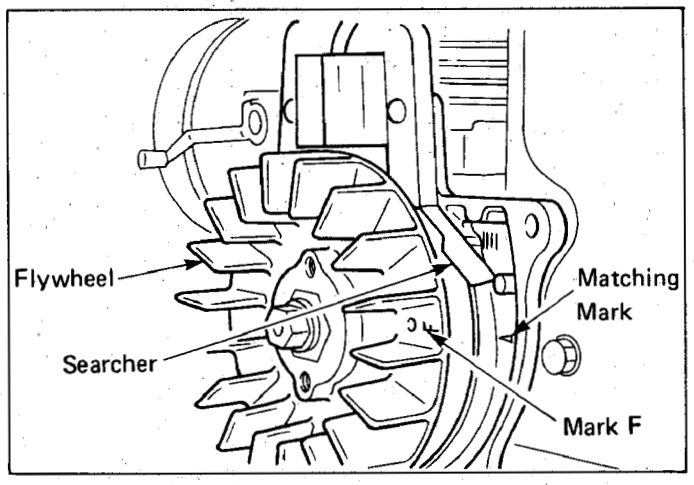


Fig. 15

4-4-19 STARTER PULLEY

Tighten the starter pulley to the flywheel with the bolt. (Use plain and spring washers.)
Note: Tightening torque . . . . . 90 ±10 kg-cm

4-4-20 FAN COVER, STOP BUTTON, GROMMET (See Figs. 16 and 17.)

Install the stop button with lockwasher on the fan cover. Insert the high-tension cord into the grommet, and install baffle rubber on the fan cover. Fit the grommet into the fan cover groove and, with the tip of the rubber baffle at the round boss in the crankcase, fasten the fan cover on the crankcase with the bolt.
Note: Be careful not to pinch the stop button cord between the crankcase and fan cover. Also exercise care not to drop the rubber baffle during fan cover reassembly.

Tightening torque . . . . . 90 ±10 kg-cm

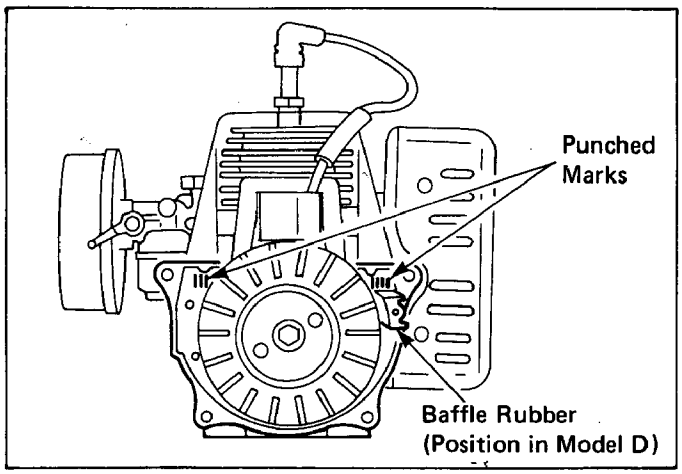
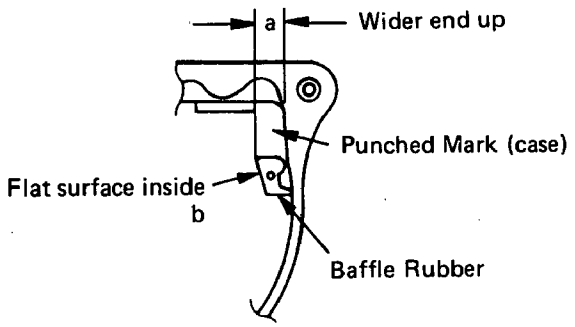


Fig. 16

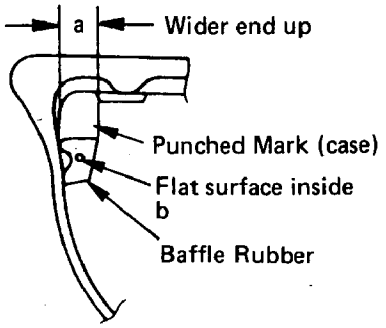
Buffle Rubber Installing Method

Whichever type, D or B, your engine is, be careful of the punched marks on the crankcase in reassembing.



Type D

Note: Install right of the magneto.



Type B

Note: Install left of the magneto.

Fig. 17

4-4-21 CYLINDER COVER

Insert the cylinder cover tips into the matching slots in the crankcase, and tighten the cylinder cover on the cylinder. (See Fig. 18.)

Note: Insert the cylinder cover tips into the slots on both sides.

Tightening torque . . . . . 80 ± 10 kg-cm

Cylinder Cover Installing Method

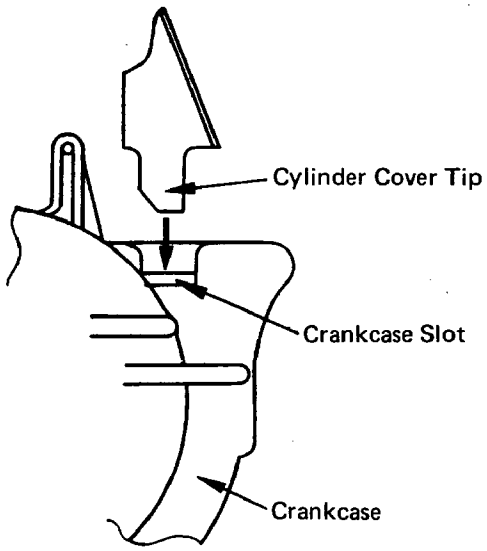


Fig. 18

4-4-22 FUEL TANK

Insert the fuel pipe into the carburetor, clamp it, and mount the fuel tank on the cylinder fan cover.

Note: Tightening torque . . . . . 90 ± 10 kg-cm

5. CONTACT BREAKER ADJUSTING PROCEDURE (EC06)

1) Remove the fan cover.
2) Remove the starter pulley.
3) Remove the flywheel.
4) Loosen the capacitor screws.
5) Remove the point cover.
6) Remove carbon and other foreign particles from the point, polish the contact surface with sandpaper No.400 or equivalent, and wipe dirt off with a cloth.
7) Temporarily fasten the flywheel, bring the mark F in line with the matching mark on the crank case, and remove the flywheel, exercising care not to turn it.
8) Now, in this state, adjust the contact breaker as shown below. (See Fig. 19.)

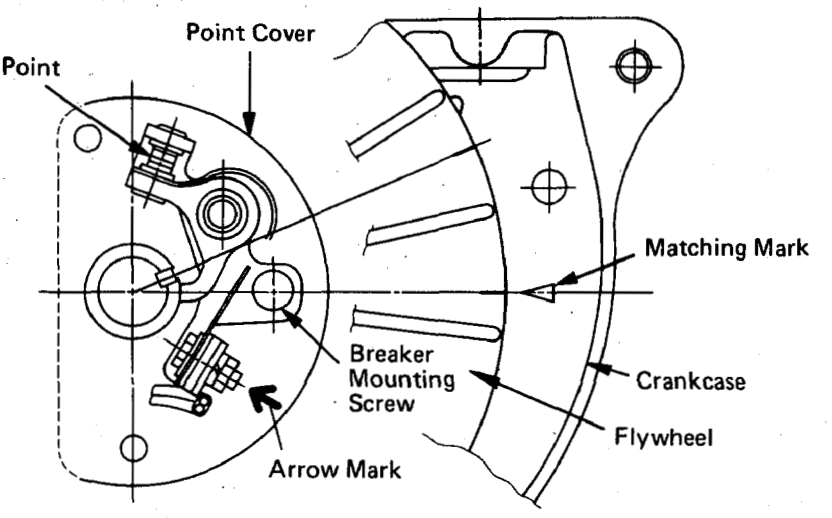


Fig. 19

Note: If the points are open in the sate illustrated above, ignition timing goes wrong to a serious extent. Be careful not to move the points especially when tigtening the breaker mount screw.

Ignition timing ..... 23° ±2°

a) Loosen the breaker mounting screw.
b) Push the breaker in the arrow direction to a position just before the points begin to open (using a timing tester, for example), and tighten the breaker mounting screw.
c) After the point adjustment, install the point cover, capacitor, magneto, and fan cover in this order.

6. CARBURETOR ADJUSTMENT

The carburetor is carefuuly adjusted in the factory before shipment. Never attempt to adjust it except when necessary.

1) Idling Adjustment (See Fig. 20.)
   Move the governor lever to the lowest speed position (so that the carburetor throttle valve fully closes), and check that the engine idles quiet and smooth. This is the ideal idling condition. Normally, the engine is set to an idling speed of 1600 ±100 rpm, for which the following two methods may be used.
   a) Low-speed stopper screw
      Engine speed increases if the low-speed stopper screw on the carburetor is turned clockwise, or decreases if it is turned counterclockwise.
   b) Pilot screw (Do not turn it except when necessary.)
      When the pilot screw is turned clockwise, the fuel-air mixture decreases and the engine slows down. If the pilot screw is turned counterclockwise, the fuel-air mixture increases to raise engine speed. The normal position of the pilot screw is one turn and a quarter back from the clockwise extremity.

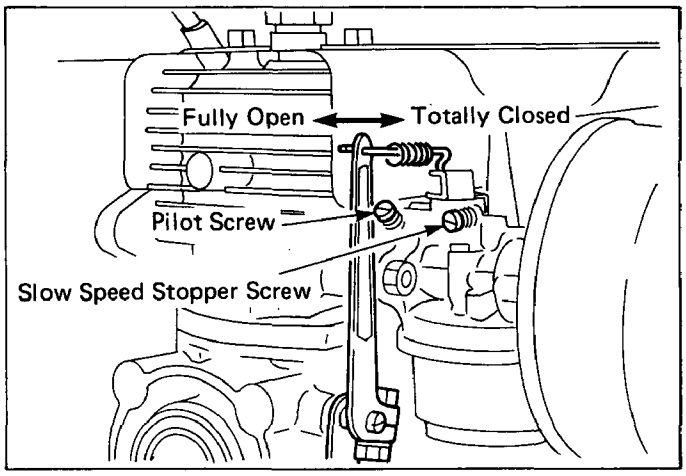


Fig. 20

2) Maximum Speed Adjustment (See Fig. 21.)
   The standard maximum speed is 5000 rpm for EC06, or 5500 rpm for EC08.
   Move the governor lever to the highest speed position, adjust the crankshaft rpm to 5000 (EC06) or 5500 (EC08) with the high-speed stopper bolt, and lock the bolt with the nut.

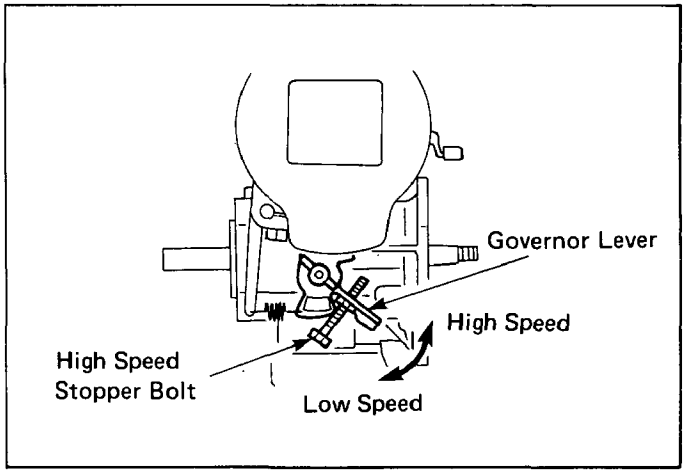


Fig. 21

7. GOVERNOR ADJUSTMENT

Fully open the carburetor butterfly valve, fasten the governor lever, turn the governor shaft fully counterclockwise, and fasten the governor lever on the governor shaft with the nut. (See Figs. 22 and 23.)

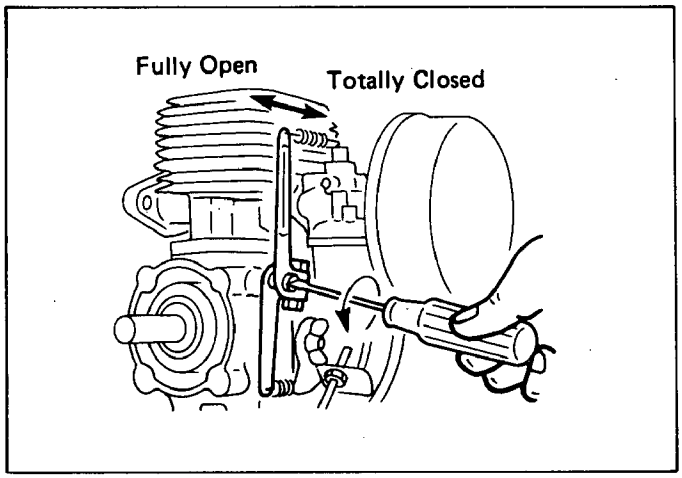


Fig. 22

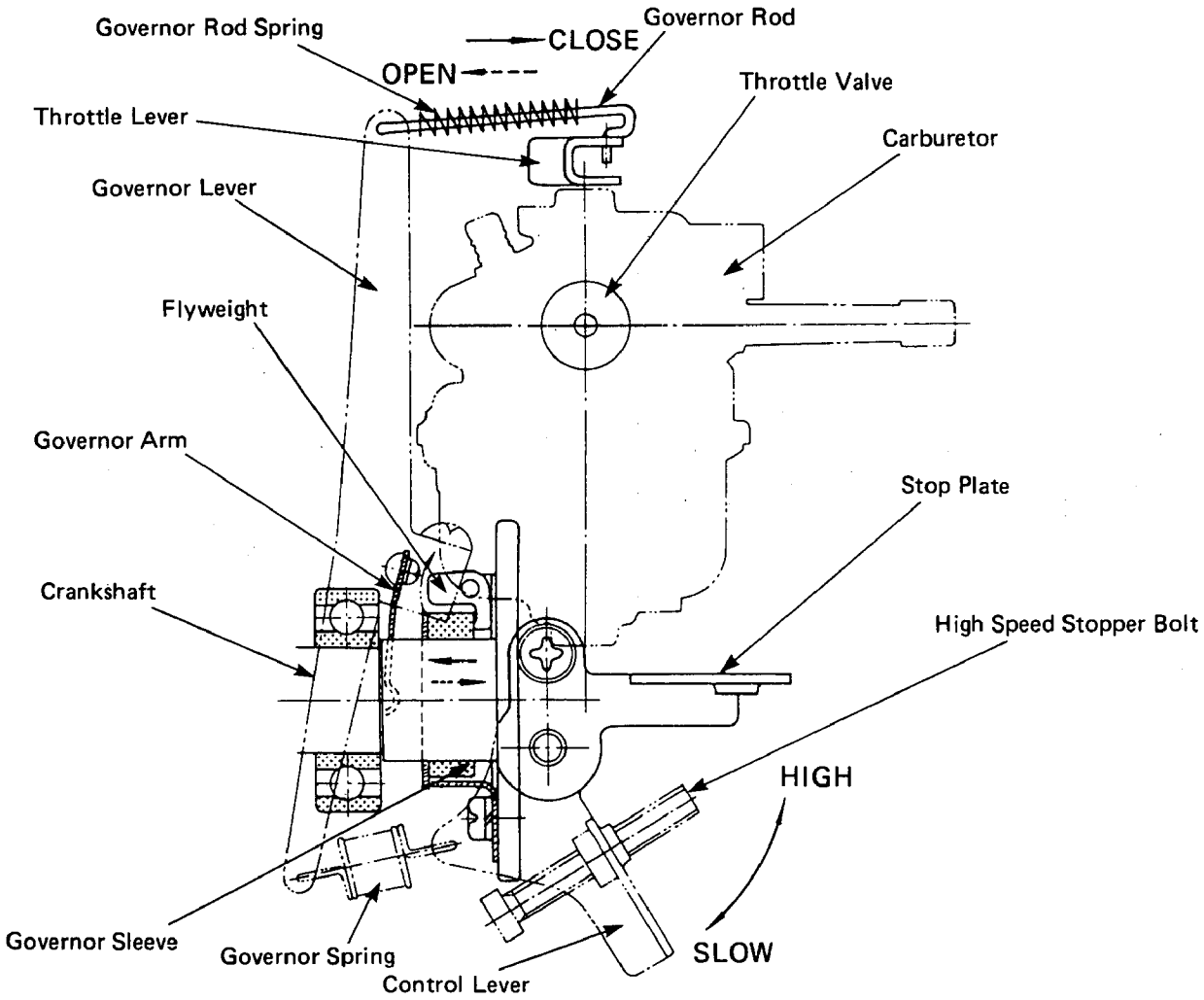


Fig. 23

8. TROUBLE-SHOOTING

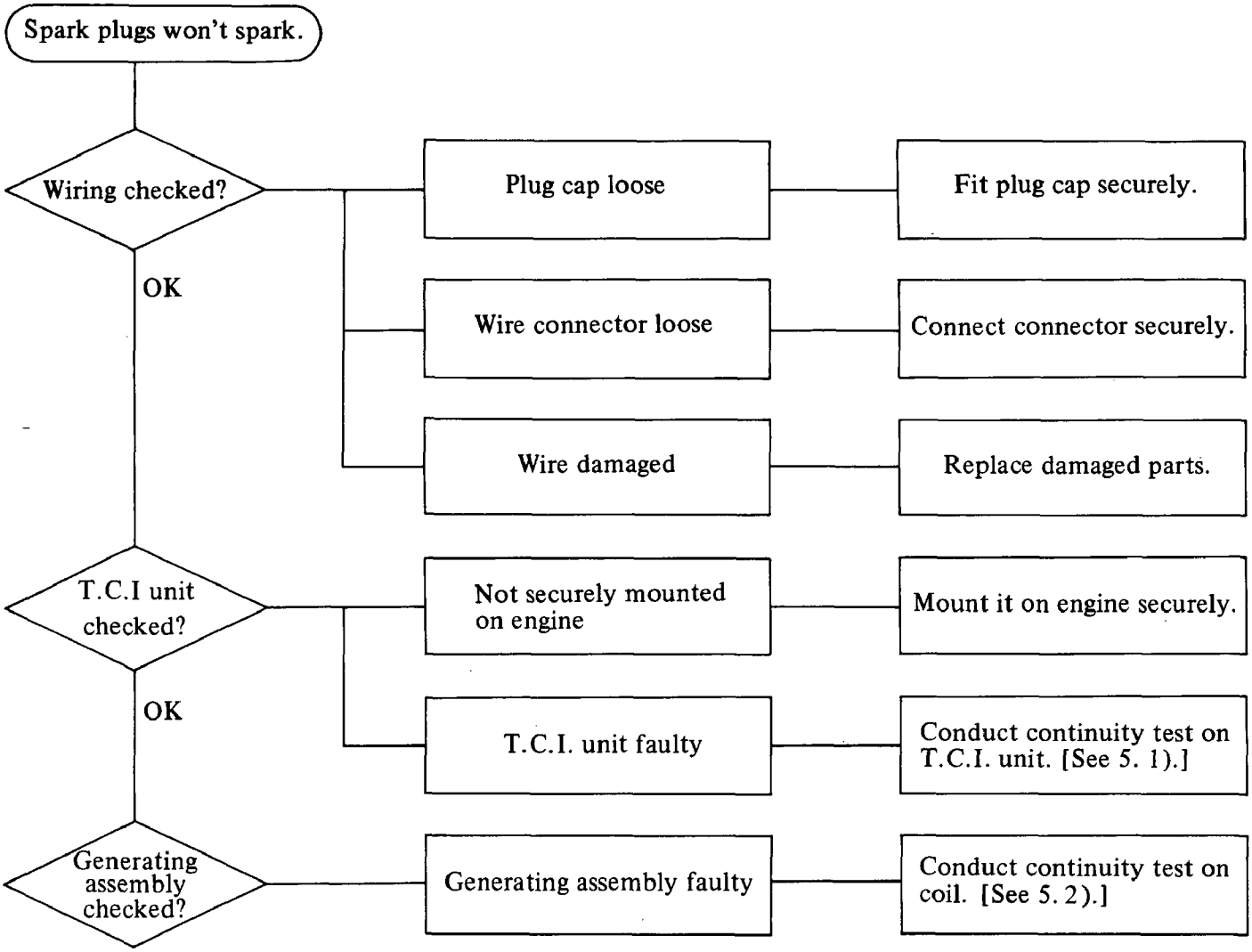
The following three conditions must be satisfied for satisfactory engine start:
1) The cylinder filled with a proper fuel-air mixture
2) An appropriate compression in the cylinder
3) Good spark at correct time to ignite mixture

The engine cannot be started unless these three conditions are met. There are also other factors which make engine start difficult, e.g., a heavy load on the engine when it is about to start at low speed, and a high back pressure due to a long exhaust pipe, just to say a few.
The most common causes of engine troubles are given below:

8-1 STARTING TROUBLE

Trouble	Cause	Remedy	Preventive hints
No or little spark	Spark plug defective	(1) If spark plug is dirty, clean it well with gasoline or polish it with sand-paper. Remove foreign matter if any. (2) Adjust spark gap to 0.6 ~ 0.7 mm. (3) If spark plug has faulty instulation due to breakage, replay it with a new one.	(1) Use a spark plug of the specified heat value. Do not use low-quality oil. Clean the air cleaner to prevent dust from entering. (2) Be careful not to strike the center pole or forcibly twist it in adjusting spark gap. Otherwise, insulation breaks down.
	High-tension cable defective	If defective, replace the cable and ignition coil together.	
	Contact breaker defective	(1) If points are rough, polish them with sand-paper No. 400. (2) If point gap is wrong, loosen contact mount screw, and adjust it to 0.35 ± 0.05 mm. Also adjust ignition timing if possible. (3) If ignition timing is wrong, adjust it to 23° ± 2° before top dead center. (4) If breaker has faulty insulation, replace the breaker with a new one. (5) If capacitor is defective, replace it with a new one.	

Trouble	Cause	Remedy	Preventive hints
No or little spark	Magneto defective	(1) If coil is broken or its insulation defective, replace magneto with a new one. (2) If magnetism has decreased, have it remagnetized at magneto manufacturer's or replace magneto with a new one.	
	Electrical system defective	(1) If stop button is defective (grounded), repair or replace it. (2) If primary wire is grounded to the engine body, insulate it with tape.	
No or little compression	Fuel leaks from gaskets or other	(1) If head gasket is defective, replace it with a new one. (2) If spark plug is loose, retighten it securely. (3) If spark plug is defective, replace it with a new one.	
	Piston defective	(1) If piston is worn, replace it with a new one. (2) If piston rings are worn, replace them with new ones.	(1) Keep air cleaner clean. (2) Do not use low-quality oil. (3) Change oil periodically.
No fuel feed	Fuel tank defective	(1) Clean tank outlet if clogged up. (2) Clean fuel strainer if clogged up. (3) If wrong fuel is used or if water is in fuel tank, change fuel. (4) If air is trapped in fuel pipe, discharge air.	(1) Pour fuel into the fuel tank through filter. (2) Use gasoline-oil (25 to 1) mixture.
	Carburetor defective	(1) Clean carburetor if clogged up. (2) Replace carburetor with a new one if defective. Clean jets and orifices if clogged up.	
Excessive fuel suction		(1) Fully open choke, half open throttle valve, and start engine. (2) Remove crankcase drain plug, close fuel cock, actuate starter a few times to discharge excess fuel.	(1) Never close choke if engine is warm. (2) Be sure to idle engine for some time before stopping it. This not only makes next starting easy but helps extend engine life. (3) Completely clean air cleaner because a clogged up air cleaner thickness fuel.
	Carburetor defective	(1) If carburetor overflows, check needle valve seat for wear, and replace if necessary.	
Excessive resistance to starting	Excessive load	(1) Adjust power transmission belt tension if too high. (2) If it is still hard to start, install a clutch.	
	Piston or connecting rod sticky	(1) If piston is sticky, replace it with a new one. (2) If connecting rod is sticky at large or small end, replace it with a new one.	(1) Do not use low-quality oil. (2) Use fuel of correct gasoline-oil ratio.



1) Continuity test on T.C.I. unit
   Conduct this test using the T.C.I. unit checker (Part No.106 79902 00).
   a) Select either AC or DC. (Battery is installed inside.)
   b) Connect the unit's primary lead (black for type D, or yellow for type B) to jack E (black) and the unit casing (or the crankcase if the unit is mounted on the engine) to jack C (red) with the supplied cable.
   c) Turn the select dial to the position corresponding to the engine type.
   d) Keep the check switch in the ON position, and wait until the pilot lamp (LED) lights.

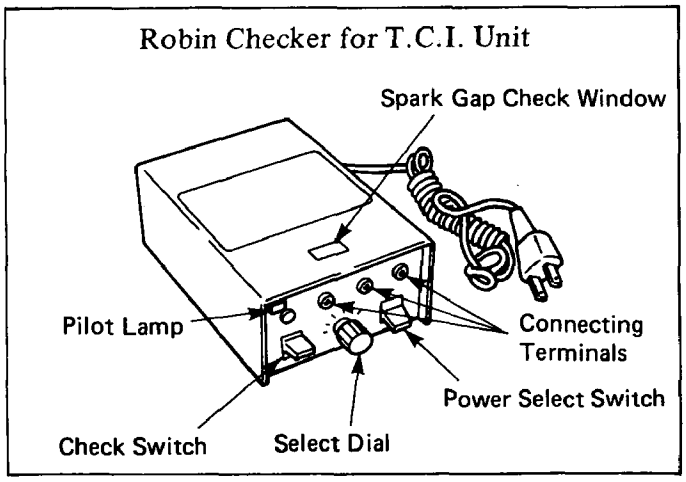


Fig. 24

e) When the pilot lamp turns on, return the check switch to the OFF position. The T.C.I. unit is normal if a spark is observed at that instant.

If the T.C.I. unit checker is not available, use a circuit tester as described below.

*i) Connect the positive (+) terminal of the tester to the primary lead.
Connect the negative (−) terminal of the tester to the unit casing.
Resistance: 80 to 150 ohms (Tester range x 1 ohm)

*ii) Connect the negative (−) terminal of the tester to the primary lead.
Connect the positive (+) terminal of the tester to the unit casing.
Resistance: 7 to 10 k ohms (Tester range x 100 ohms)

If the T.C.I. unit is found not normal by the above test, replace the unit.

2) Continuity test on generating assembly
Measure the resistance with a circuit tester.
a) Resistance between primary lead and core: 1.1 to 1.5 ohms
b) Resistance between secondary lead and core: 10 to 13 k ohms
If the generating assembly is found not normal by the above test, replace the assembly.

Note: A circuit tester is not so accurate that the resistance values measured by the tester may vary depending on the type of tester, or the condition of battery, or the skill of operator.

8-2 IDLING IMPROPER

1) If the carburetor's pilot screw is not correctly adjusted, adjust it. (Refer to the section on carburetor adjustments.)
2) Any of starting trouble causes leads to improper idling.

8-3 OVERHEATING and ENGINE KNOCKING

1) If ignition timing is advanced, adjust it to 23° ± 2°. (EC06)
2) If the cmbustion chamber has excessive carbon deposits, clean it.
3) If a spark plug of a heat value too low is used, use one of the specified heat value. Example: NGK B6HS for EC06, NGK B7HS for EC08
4) If the gasoline air-mixture is too lean, clean the jets and orifices of the carburetor. Also clean the air-cleaner.
5) If overload is the case, reduce it to normal level or below.

8-4 POWER DROP

1) Replace the cylinder, piston, and/or piston rings if worn.
2) If the carburetor is faulty, adjust or clean it.
3) If the spark plug is faulty (dirty, leaky, or not properly insulated), clean or replace it.
4) Retighten the cylinder if gas leaks.
5) Replace or adjust if the magneto or contact breaker is faulty.
6) Clean the air cleaner if clogged up.
7) Replace the crankshaft oil seals if compressed gas leaks due to seal wear.

8-5 EXCESSIVE FUEL CONSUMPTION

1) If the gasoline-air mixture fuel is too rich, clean the carburetor jets and orifices.
2) Replace the carburetor if its throttle shaft is worn.
3) Retighten or replace parts if fuel leaks.
4) Take the steps against power drop described in Paragraph 8-4 above because excessive fuel consumption also results from power drop.

8-6 HUNTING

1) If the governor lever, governor shaft, or governor spring is not properly set or adjusted, readjust or correct it.
2) If the mixture fuel is too lean, clean the carburetor.
3) If the carburetor pilot screw is the cause, readjust it.
4) If the governor spring is worn, replace it.
5) If the governor sleeve does not work properly, correct it.
6) Replace the flyweight or governor sleeve if worn.
7) If the governor shaft does not work properly, correct it.

8-7 OTHER TROUBLES

1) Carburetor overflow
   If the fuel overflows the carburetor to the air cleaner, or collects excessively in the crankcase during stoppage, either the float valve or float is faulty. Replace or correct the faulty one.
2) If the engine abruptly stops with an abnormal noise, it is due to a sticky piston, crankshaft, or connecting rod. Adjust or replace the faulty parts.
3) If any abnormal noise is heard during engine operation, be sure to stop the engine immediately. Do not start the engine again until the cause is determined.
   If you cannot find the cause, contact your nearest dealer or service shop, and observe their advice.

9. CHECKS and CORRECTIONS

After disassembling and cleaning the engine, check and adjust the parts according to the Standard Correction Table, which provides important information to be referred to in adjusting or repairing the engine. Be familiar with the table and conform to the standards specified in servicing the engine.

The terms used in the table are defined as follows:

1) Correction
   Repair, adjustment, or replacement of any engine part
2) Correction limit
   The limit of wear, damage, or function degradation beyond which an engine part can hardly serve its purpose unless it is corrected.
3) Standard dimensions
   Design dimensions less tolerance

9-1 ENGINE STANDARD CORRECTION TABLE

Measuring/Correcting Point		Model	Standard Dimensions	Correction Limit	Measuring	Instrument	Correction
Cylinder and Piston	Clearance between piston and cylinder	EC06	Perpendicular to pin 0.07~0.106L Pin direction 0.09~0.146L	0.18L	Calculate from parts measurements.		Replace
		EC08	Perpendicular to pin 0.04~0.076L Pin direction 0.07~0.126L				
	Bore	EC06	+0.016 0 44φ	+0.08	Average of maximum and minimum inside diameters	Cylinder gauge	Replace
		EC08	+0.016 0 50φ				
	Piston outside dia.	EC06	43.93φ	-0.05	Average of maximum and minimum outside diameters	Micrometer	Replace
		EC08	49.96φ				
	Piston ring side clearance	EC06	First ring 0.05~0.09L Second ring 0.04~0.08L	0.15L	Measure after removing carbon.	Searcher	Replace
		EC08	First ring 0.06~0.10L Second ring 0.03~0.07L				
	Piston ring groove width	EC06, EC08	1.8	+0.13	Measure maximum groove width.	Block gauge	Replace
	Piston ring width	EC06, EC08	1.8	-0.10	Measure minimum width.	Micrometer	Replace
	Ring gap	EC06, EC08	0.1~0.3	1.0	Ring in contact with cylinder wall	Searcher	Replace
	Clearance between piston and piston pin	EC06, EC08	0.005T~0.014L	0.03L	Calculate from parts measurements		Replace
	Piston pin hole	EC06, EC08	12φ	+0.03	Measure maximum inside diameter	Cylinder gauge	Replace
	Piston pin outside diameter	EC06, EC08	12φ	-0.017	Measure minimum outside diameter.	Micrometer	Replace

Measuring/Correcting Point		Model	Standard Dimensions	Correction Limit	Measuring	Instrument	Correction
Crankshaft and Connecting Rod	Connecting rod large end side clearance	EC06, EC08	0.1~0.6L	0.8L	Measure after reassembly	Searcher	Replace
	Crankshaft deviation	EC06, EC08	0.05 or less	0.1	In reassembled state, support both ends of crankshaft, and measure it about 7.5 mm from crank web.	Dial gauge	
	Crankshaft axial play	EC06, EC08	0.15~0.69	0.1	Measure after reassembly.	Dial gauge	Replace
	Main bearing outside diameter	EC06, EC08	0.050T~0.014T	0	Calculate from parts measurements		Replace
	Housing inside diameter	EC06, EC08	Front case 47ϕ Rear case 42ϕ	−0.04	Housing	Cylinder gauge	Replace
	Bearing outside diameter	EC06, EC08	Front case 47ϕ Rear case 42ϕ	−0.016	Measure bearing outside diameter	Micrometer	Replace
	Main bearing outside diameter clearance	EC06, EC08	Front 0.013T~0.006L Rear 0.01T~0.009L	0.012L 0.015L	Calculate from parts measurements.		Replace
	Bearing inside diameter	EC06, EC08	20ϕ	+0.005	Measure bearing inside diameter.	Cylinder gauge	Replace
	Crankshaft outside diameter	EC06, EC08	20ϕ	−0.02	Measure crankshaft outside diameter	Micrometer	Replace
	Connecting rod small end inside diameter	EC06, EC08	16ϕ	+0.026		Cylinder gauge	
	Ignition timing	EC06	23°	±2°		Timing tester	Adjust
	Point gap	EC06	0.35	±0.05		Searcher	Adjust
	Air gap	EC06	0.5	0 −0.1		Searcher	Adjust
	Spark plug gap		0.6~0.7	±1		Searcher	Adjust

9-2 TABLE of TIGHTENING TORQUE

No.	Parts to tighten	Tightening torque	Screw diameter	Remarks
		kg-cm		
1	Cylinder Cover, Muffler Cover	80 ±10	M6 5T	
2	Fan Cover, Tank Support Plate, Starter, Starter Pulley	90 ±10	M6 5T	
3	Crankcase	110 ±20	M6 7T	
4	Air Cleaner	50 ±5	M5 5T	
5	Reduction Cover	110 ±20	M6 7T	Type B only
6	Muffler	80 ±10	M6	Nut
7	Cylinder	110 ±10	M6 7T	Nut
8	Carburetor	80 ±10	M6 4T	Nut
9	Governor Yoke	18 ±2	M3 4T	
10	Governor Plate	50 ±5	M5 4T	Apply screw lock (FT15 or equivalent) and install (as in the case of EC05, EC07)
11	Ignition coil	50 ±5	M5 4T	
12	Contact Breaker, Condensor Point Cover	25 ±2	M4 4T	
13	Reduction Pinion	340 ±20	M12 4T	Nut, Type B only
14	Spark Plug	275 ±25	M14	
15	Magneto Flywheel	400 ±20	M10 6T	
16	Governor Lever	80 ±10	M6 4T	
17	Stop Button	40 ±5	M4 4T	
18	Rear Half of Crankcase	–	M6 (Stand)	Apply screw lock (FT15 or equivalent) and install (as in the case of EC05, EC07)

Note: Be careful not to apply screw lock more than necessary.

10. MAINTENANCE and STORING

The following maintenance jobs apply when the engine is operated correctly under normal conditions. The indicated maintenance intervals are by no means guarantees for maintenance free operations during these intervals. For example, if the engine is operated in extremely dusty conditions, the air cleaner should be cleaned every day, instead of every 50 hours.

10-1 DAILY CHECKS and MAINTENANCE

1) Remove just from whatever which accumulated dust.
2) Check external fuel leakage. If any, retighten or replace.
3) Check screw tightening. If any lose one is found, retighten.
4) Clean air cleaner.

10-2 EVERY 50 HOURS CHECKS and MAINTENANCE

Check spark plug. If contaminated, wash in gasoline or polish with emery paper.

10-3 EVERY 150 HOURS CHECKS and MAINTENANCE

1) Clean fuel strainer and fuel tank.
2) Clean contact breaker points.
3) Clean exhaust port of cylinder and both inlet and outlet of muffler.

10-4 YEARLY CHECKS and MAINTENANCE

1) Remove carbon from cylinder head and piston head.
2) Clean fuel tank inside.
3) Clean carburetor float chamber inside.
4) Clean contact breaker and adjust point gap.
5) Replace fuel pipe once a year.

10-5 PREPARATION for LONG ABEYANCE

1) Perform the above 10-1 and 10-2 maintenance jobs.
2) Drain fuel from the fuel tank and carburetor float chamber.
3) Remove spark plug, and apply 5 to 10 cc of lubricating oil through the spark plug hole. Perform idle operation several times by pulling the recoil starter handle slowly. Re-install the spark plug.
4) Clean the engine outside with oiled cloth.
5) Put a vinyl or other cover over the engine and store the engine in dry place.

Industrial Engines

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